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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/865,797	05/25/2001	Michael A. Corrigan	IO-1058-US	4375

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EXAMINER

SAN MARTIN, EDGARDO

ART UNIT PAPER NUMBER

2837

DATE MAILED: 12/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

### Office Action Summary

Application No.	Applicant(s)	
09/865,797	CORRIGAN ET AL.	
Examiner	Art Unit	
Edgardo San Martin	2837	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 27 October 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-28, 30 and 32-62 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-21, 23-28, 30, 32-40, 42-53 and 55-62 is/are rejected.
- 7) ☒ Claim(s) 7, 22, 41 and 54 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

#### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other:

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 27, 2003 has been entered.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1 – 26 and 35 – 61 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 15, 35, 48 and 61 recite the limitation "high-g shock". The Examiner considers that the term is relative and makes the claims indefinite because it is not clear with respect to what measurement, amount or magnitude the g shocks are high.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claim 62 is rejected under 35 U.S.C. 102(b) as being anticipated by Won (US 4,310,066).

Won teaches an apparatus for sensing seismic waves in the earth, the apparatus, comprising a housing having a tapered wall; and one or more seismic sensors disposed in the housing to form a sensor module, the sensor being inserted into the ground for sensing the seismic waves in the earth, the housing wall having a longitudinal ridge to provide a key-type fit when the sensor module is inserted into the ground (Figs.1 and 2; Col.2, Line 67 – Col.4, Line 36).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1 – 3, 5, 12, 13, 48, 50, 52, 59 and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mazzagatti et al. (US 3,144,090) in view of Wassell (US 4,779,852).

With respect to Claims 1 and 48, Mazzagatti et al. teach an apparatus for sensing seismic waves in the earth (Figs.1 - 3), the apparatus comprising a housing (Fig.1, Item 11), one seismic sensor (Fig.1, Items 21 and 25) disposed in the housing; and at least one isolator (Fig.1, Items 23 and 27) coupled to the one or more seismic sensors for isolating the seismic sensor from vibrations induced in the housing (Col.3, Lines 7 - 50), but fail to disclose wherein the vibrations induced in the housing are high-g shocks.

On the other hand, Wassell teaches an apparatus for sensing seismic waves in the earth (Fig.1A), the apparatus comprising a housing, one seismic sensor disposed in the housing; and at least one isolator coupled to the one or more seismic sensors for isolating the seismic sensor from high-g shock induced in the housing (Col.2, Line 28 – Col.3, Line 6 and Col.6, Lines 49 – 58).

It would have been obvious to a person with ordinary skill in the art to employ the Wassell isolator with the Mazzagatti et al. seismic sensor design because the isolator would protect the sensors from severe shocks and vibrations increasing the utility life of the equipment, and also improving the measurements of the desired seismic signals.

With respect to Claims 2 and 50, Mazzagatti et al. teach wherein the at least one isolator is disposed to provide isolation from the induced vibrations in at least one predetermined direction (Figs.1 and 3).

With respect to Claim 3, Mazzagatti et al. teach further comprising an electronics package (Fig.6, Items 67, 69 and 71) disposed in the housing and wherein the at least one sensor form at least a portion of the electronic package.

With respect to Claims 5 and 52, Mazzagatti et al. teach wherein the at least one isolator further comprises a layer of silicone rubber (Col.3, Lines 16+).

With respect to Claims 12, 13 and 59, Mazzagatti et al. teach further comprising a cap (Fig.1) coupled to the housing, the cap having a feed through for providing conductor (Fig.1, Item 13) access to the seismic sensor, and wherein the cap and housing are coupled to form a sealed sensor module.

With respect to Claim 61, Mazzagatti et al. teach wherein the housing wall having a thickness selected to provide wall flexure for damping shock induced in the housing (Col.2, Lines 44 – 51).

5. Claims 4, 6, 51 and 53 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mazzagatti et al. (US 3,144,090) in view of Wassell (US 4,779,852), and further in view of Carpenter et al. (US 5,463,193).

With respect to Claims 4 and 51, Mazzagatti et al. and Wassell teach the limitations discussed in the previous rejection, but fail to disclose wherein the at least one predetermined direction further comprises directions along three translational axes and three angular axes.

On the other hand, Carpenter et al. teach a vibration isolation system wherein the isolation system isolate a device in directions along three translational axes and three angular axes (Fig.1; Col.1, Lines 32 – 58).

It would have been obvious to a person with ordinary skill in the art to employ the Carpenter et al. vibration isolation configuration with the Mazzagatti et al. and Wassell sensor system because the sensor would be isolated from vibration coming from all direction making the sensor more sensitive to the seismic vibration, making the sensor system more reliable.

With respect to Claims 6 and 53, Carpenter et al. teach a vibration damper comprising polyurethane (Col.2, Line 33 +).

It have been obvious to a person with ordinary skill in the art to employ a vibration isolator comprising a layer of silicone rubber and a second layer of polyurethane foam because they are very well known vibration dampers elements and would be obvious to employ them in combination to increase the vibration damping effect.

6. Claims 8, 14 -16, 18, 20, 24 - 26, 35 – 37, 39, 45 - 47, 49, 55 and 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mazzagatti et al. (US 3,144,090) in view of Wassell (US 4,779,852), and further in view of Hall, Jr. (US 4,163,206).

With respect to Claims 8, 15, 35, 36, 49 and 55, Mazzagatti et al. and Wassell teach the limitations discussed in a previous rejection, but fail to disclose further comprising an inertial mass operatively associated with the sensor.

Nevertheless, Hall, Jr. teaches a seismic detector comprising an inertial mass (Fig.2, Item 36) operatively associated with the sensor (Fig.2, Item 15).

It would have been obvious to a person with ordinary skill in the art to employ the Hall, Jr. inertial mass with the Mazzagatti et al. and Wassell sensor because of the

nature of an accelerometer; an inertial mass is needed in some designs for the accelerometer to work properly.

With respect to Claims 14, 26, 47 and 60, Hall, Jr. teaches wherein the sealed sensor module is hermetically sealed (Col.4, Lines 19 – 21).

With respect to Claims 16, 18 and 37, Mazzagatti et al. teach wherein the at least one isolator is disposed to provide isolation from the induced vibrations in at least one predetermined direction (Fig.1).

With respect to Claims 20 and 39, Mazzagatti et al. teach wherein the at least one isolator further comprises a layer of silicone rubber (Col.3, Lines 16+).

With respect to Claims 24, 25, 45 and 46, Mazzagatti et al. teach further comprising a cap (Fig.1) coupled to the housing, the cap having a feed through for providing conductor (Fig.1, Item 13) access to the seismic sensor, and wherein the cap and housing are coupled to form a sealed sensor module.

7. Claims 9, 10, 11 and 56 – 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mazzagatti et al. (US 3,144,090) in view of Wassell (US 4,779,852) and further in view of Alft et al. (US 6,315,062).

Mazzagatti et al. and Wassell teach the limitations discussed in a previous rejection, but fail to disclose wherein the one or more accelerometer sensors are three accelerometers disposed to provide three orthogonal axes of sensitivity, and wherein the one or more accelerometers are MEMS accelerometers.

On the other hand, Alft et al. teach a sensor system employing one or more accelerometer sensors that are three accelerometers disposed to provide three



orthogonal axes of sensitivity, and wherein the one or more accelerometers are MEMS accelerometers (Col.9, Lines 4 – 40).

It would have been obvious to a person with ordinary skill in the art to employ the Alft et al. multiple MEMS accelerometers with the Mazzagatti et al. and Wassell design because the MEMS accelerometers are smaller in size and could be placed at any adequate place without increasing the size of the element.

8. Claims 17, 23 and 42 - 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mazzagatti et al. (US 3,144,090) in view of Wassell (US 4,779,852) and Hall, Jr. (US 4,163,206), and further in view of Alft et al. (US 6,315,062).

Mazzagatti et al., Wassell and Hall, Jr. teach the limitations discussed in a previous rejection, but fail to disclose wherein the one or more accelerometer sensors are three accelerometers disposed to provide three orthogonal axes of sensitivity, and wherein the one or more accelerometers are MEMS accelerometers.

On the other hand, Alft et al. teach a sensor system employing one or more accelerometer sensors that are three accelerometers disposed to provide three orthogonal axes of sensitivity, and wherein the one or more accelerometers are MEMS accelerometers (Col.9, Lines 4 – 40).

It would have been obvious to a person with ordinary skill in the art to employ the Alft et al. multiple MEMS accelerometers with the Mazzagatti et al., Wassell and Hall, Jr. design because the MEMS accelerometers are smaller in size and could be placed at any adequate place without increasing the size of the element.

9. Claims 19, 21, 38 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mazzagatti et al. (US 3,144,090) in view of Wassell (US 4,779,852) and Hall, Jr. (US 4,163,206), and further in view of Carpenter et al. (US 5,463,193).

With respect to Claims 19 and 38, Mazzagatti et al., Wassell and Hall, Jr. teach the limitations discussed in the previous rejection, but fail to disclose wherein the at least one predetermined direction further comprises directions along three translational axes and three angular axes.

On the other hand, Carpenter et al. teach a vibration isolation system wherein the isolation system isolate a device in directions along three translational axes and three angular axes (Fig.1; Col.1, Lines 32 – 58).

It would have been obvious to a person with ordinary skill in the art to employ the Carpenter et al. vibration isolation configuration with the Mazzagatti et al., Wassell and Hall, Jr. sensor system because the sensor would be isolated from vibration coming from all direction making the sensor more sensitive to the seismic vibration, making the sensor system more reliable.

With respect to Claims 21 and 40, Carpenter et al. teach a vibration damper comprising polyurethane (Col.2, Line 33 +).

10. Claims 27, 28, 30 and 32 – 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mazzagatti et al. (US 3,144,090) in view of Hall, Jr. (US 4,163,206), and further in view of Alft et al. (US 6,315,062).

With respect to Claims 27 and 30, Mazzagatti et al. and Hall, Jr. teach the a seismic sensor module comprising a module case, a sensor assembly coupled to the

module case, the sensor assembly including one or more seismic sensors, and an inertial mass coupled to the sensor assembly for providing noise reduction in the sensor module, but fail to disclose wherein the one or more sensors are three accelerometers disposed to provide three orthogonal axes of sensitivity, and wherein the one or more accelerometers are MEMS accelerometers.

On the other hand, Aft et al. teach a sensor system employing one or more accelerometer sensors that are three accelerometers disposed to provide three orthogonal axes of sensitivity, and wherein the one or more accelerometers are MEMS accelerometers (Col.9, Lines 4 – 40).

It would have been obvious to a person with ordinary skill in the art to employ the Aft et al. multiple MEMS accelerometers with the Mazzagatti et al. design because the MEMS accelerometers are smaller in size and could be placed at any adequate place without increasing the size of the element.

With respect to Claim 28, Hall, Jr. teaches wherein the inertial mass is of metal (Col.4, Lines 41+).

With respect to Claims 32 and 33, Mazzagatti et al. teach further comprising a cap (Fig.1) coupled to the housing, the cap having a feed through for providing conductor (Fig.1, Item 13) access to the seismic sensor, and wherein the cap and housing are coupled to form a sealed sensor module.

With respect to Claim 34, Hall Jr. teaches wherein the sealed sensor module is hermetically sealed (Col.4, Line 19 – 21).

***Allowable Subject Matter***

11. Claims 7, 22, 41 and 54 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

12. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection. The Examiner considers that the patents to Mazzagatti et al., and Won teach the limitations described by the claimed subject matter as discussed above.

***Conclusion***

13. The attached hereto PTO Form 892 lists prior art made of record and not relied upon, the Examiner considered it pertinent to applicant's disclosure.

***Contact Information***

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edgardo San Martin whose telephone number is (703) 308 - 1050, after February 3, 2004 the Examiner can be reached at (571) 272-2074. The examiner can normally be reached on 8:00AM - 5:00PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Nappi can be reached on (703) 308 - 3370. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872 - 9306 for regular communications and (703) 872 - 9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Edgardo San Martín  
Patent Examiner  
Art Unit 2837  
Class 181  
December 23, 2003



**ROBERT NAPPI**  
**SUPERVISORY PATENT EXAMINER**